

Mount Diablo Astronomical Society

Diablo Moon Watch

June 2013

GENERAL MEETING

Tuesday June 25, 2013

Accessing Original NASA Observations Online

By Jeff Adkins

**Doors open at 6:45 p.m.
Lindsay Wildlife Museum
1931 First Avenue,
Walnut Creek, CA 94597**

**Please park East of the
museum, follow the
instructions on the last page**

Most of us see NASA space telescope and probe images and data only when NASA releases it in a press release or in books.

But what does it look like when the data arrives, and can amateurs access and use it? The answer is yes. Local teacher and author Jeff Adkins will show you how to access NASA images from past and current missions such as the Spitzer Space Telescope,



Hubble, Fermi, and others. You can do photometry, search for planets in other solar systems, make 3-color pictures using free software and NASA FITS images, and more.

Mr. Jeff Adkins is a long time MDAS member and award-winning teacher in Antioch, CA. He teaches Physics and Astronomy at Deer Valley High School, and Intro Physics and Astronomy at Los

Medanos College. He is the author of a high school activity workbook for astronomy called Conceptual Astronomy, and serves as a NASA Education Ambassador for Astrophysics.

WHAT'S UP

Fritz Zwicky was a Swiss astronomer who worked most of his life at Caltech, where he made many important contributions in theoretical and observational astronomy.

By Kent Richardson



Images taken by Edouard Roberge at the May Public Night in the observatory, captured in red light.

PRESIDENT'S CORNER

Dusty Galaxies In The Bay Area

by Chris Ford

We have had a number of nights of very good seeing in the Bay Area these past two months, providing not only an excellent opportunity for visual observing but also for imaging small compact objects at high resolution, in particular galaxies!

Taking pictures of galaxies close up is one of the more demanding aspects of astrophotography as a long focal length and highly stable mount is required to deliver the necessary magnification. These are also very distant and faint objects that require long exposure times to peek out all the detail which in turn places extra demands on imaging precision and in particular the accuracy of guiding the mount while the camera shutter is open for 10 minutes per exposure or more. During this time the camera should not deviate by more than a pixel from the exact point of the sky that it is exposed to if information is not to be lost.

I wanted to touch upon what is possible from a suburban backyard this month to remind ourselves of what an extraordinary pursuit and hobby amateur astronomy is in its ability to reveal around us amazing sights that are in reach of all of us, and yet only a

small fraction of the population (you the reader) are actually aware of. Yet all of these wonders are constantly above our heads in direct line of sight.

One category of object that always puts on a good show either visually or through astro-photography, are edge-on spiral galaxies, in particular those that show prominent dust lanes that are a common feature of these objects when viewed from the side.

These bands of interstellar dust are where if life exists, planets most likely to harbor life are going to be found around the embedded stars as these are the most active areas of the galaxy in terms of star formation and the recycling of metallic elements and other building blocks of more complex matter. It is for this rea-

son and the beauty of these objects, that visually observing and imaging these attractive objects is one of my favorite photographic targets.

The two images in this Presidents corner were both exposed this late spring from my backyard in Moraga at a focal length of 3,708mm with a CCD camera in separate Red, Green, Blue, and Luminance exposures lasting about an hour each, so about 4 hours of accumulated exposure in total. That was enough time to pull out the fine detail in the dust lanes which so mirrors what we see in our own Milky Way.

A great example of a dusty edge-on galaxy is NGC4565 in image #1. The "blob" to the galaxies left is not an artifact or spurious reflection, but is actually a another very small and distant



NGC4565 or the Needle Galaxy

Dusty Galaxies In The Bay Area (Continued from the previous page)

irregular "faint fuzzy". One challenging question when looking at pictures of galaxies like this is what actual color are they? A quick Google of various images of this object will reveal many different color balances, often with highly saturated blues visible in the pointed outer edges of the galaxy disc. Though there is a faint blue barely visible in my image, I generally prefer to adopt a minimalist approach to processing these images wherein after normalizing the specific CCD sensors RGB ratio balance, I just go with whatever my camera records which in this case is a distinct brown and orange-ness. Well that's what I went with.

Another interesting and dusty galaxy visible in the spring sky is NGC3628, the largest but faintest galaxy in the Leo Triplet that also includes M65 and M66. Again this edge on spiral shows a wonderfully detailed structure in the dust



Not mine! This is a Hubble image of a section of the dust lanes in the Needle galaxy NGC4565. What a wonderfully vibrant and beautiful object which is almost like looking at a reflection of our own Milky Way.

lanes and both this object and the Needle galaxy also show a lot of detail to the naked eye under magnification, especially under very dark skies.

There are many other dusty edge-on galaxies like this to observe and image of course. The Sombrero galaxy is probably the most famous of all but one I did not get a chance to image this year so far. Others worth looking at include NGC891 and NGC 253.

I always feel that one of the most visceral experiences in astronomy and astrophotography is that I can look directly into the dust lanes of galaxies tens of millions of light years away, right from my backyard next to my kitchen where I eat dinner with my family. It profoundly puts into perspective ones place and sense of interconnectedness with the rest of the universe.

Clear skies!

— Chris Ford



NGC 3628 "The Hamburger" Galaxy and one of the Leo Triplet imaged in Luminance only.

Lightest Exoplanet Imaged So Far?

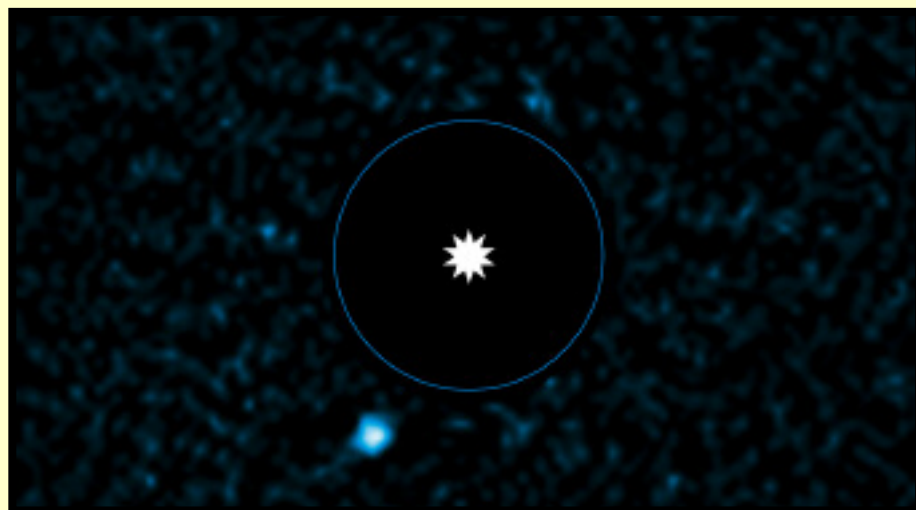
by the European Space agency

A team of astronomers using ESO's Very Large Telescope has imaged a faint object moving near a bright star. With an estimated mass of four to five times that of Jupiter, it would be the least massive planet to be directly observed outside the Solar System. The discovery is an important contribution to our understanding of the formation and evolution of planetary systems.

Although nearly a thousand exoplanets have been detected indirectly — most using the radial velocity or transit methods [1] — and many more candidates await confirmation, only a dozen exoplanets have been directly imaged. Nine years after ESO's Very Large Telescope captured the first image of an exoplanet, the planetary companion to the brown dwarf 2M1207 (eso0428), the same team has caught on camera what is probably the lightest of these objects so far [2][3].

“Direct imaging of planets is an extremely challenging technique that requires the most advanced instruments, whether ground-based or in space,”

Says Julien Rameau (Institut de Planetologie et d'Astrophysique de Grenoble, France), first author of the paper announcing the discovery. “Only a few planets have been directly



observed so far, making every single discovery an important milestone on the road to understanding giant planets and how they form.”

In the new observations, the likely planet appears as a faint but clear dot close to the star HD 95086. A later observation also showed that it was slowly moving along with the star across the sky. This suggests that the object, which has been designated HD 95086 b, is in orbit around the star. Its brightness also indicates that it has a predicted mass of only four to five times that of Jupiter.

The team used NACO, the adaptive optics instrument mounted on one of the 8.2-metre Unit Telescopes of ESO's Very Large Telescope (VLT). This instrument allows astronomers to remove most of the blurring effects of the atmosphere and obtain very sharp images. The observations were made using infrared light and a technique called differential imaging, which improves the contrast

between the planet and dazzling host star.

The newly discovered planet orbits the young star HD 95086 at a distance of around 56 times the distance from the Earth to the Sun, twice the Sun-Neptune distance. The star itself is a little more massive than the Sun and is surrounded by a debris disc. These properties allowed astronomers to identify it as an ideal candidate to harbour young massive planets. The whole system lies some 300 light-years away from us.

The youth of this star, just 10 to 17 million years, leads astronomers to believe that this new planet probably formed within the gaseous and dusty disc that surrounds the star. “Its current location raises questions about its formation process. It either grew by assembling the rocks that form the solid core and then slowly accumulated gas from the environment to form the heavy atmosphere, or started forming from a gaseous clump that arose from

Lightest Exoplanet Imaged So Far? *(Continued from the previous page)*

gravitational instabilities in the disc.” explains Anne-Marie Lagrange, another team member. “Interactions between the planet and the disc itself or with other planets may have also moved the planet from where it was born.”

Another team member, Gaël Chauvin, concludes, “The brightness of the star gives HD 95086 b

an estimated surface temperature of about 700 degrees Celsius. This is cool enough for water vapour and possibly methane to exist in its atmosphere. It will be a great object to study with the forthcoming SPHERE instrument on the VLT. Maybe it can also reveal inner planets in the system — if they exist.”

More information

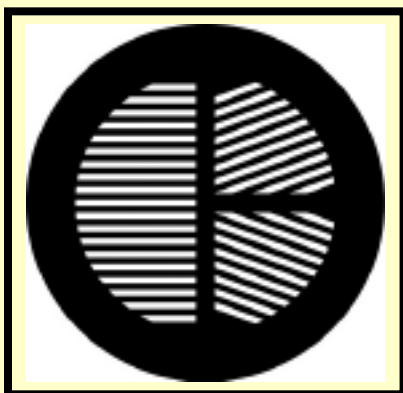
This research was presented in a paper entitled, “Discovery of a probable 4-5 Jupiter-mass exoplanet to HD95086 by direct-imaging”, to appear in the journal *Astrophysical Journal Letters*.

Astrophotography Corner: Focusing with a Bahtinov Mask and a DSLR

by Stuart Forman

It's often said in astrophotographic circles that the three most important things in astrophotography are the mount, the mount and the mount. But regardless of what mount

you use, focusing is essential. You can ruin a multiple hour imaging session if your focusing is a little off, and you certainly don't want to waste those clear moonless nights!



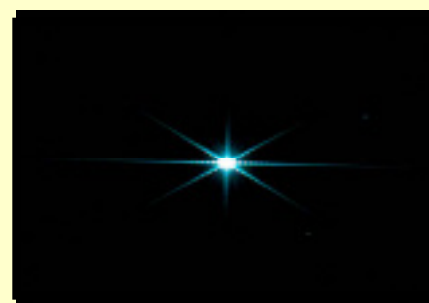
There are multiple ways to focus, and lots of software to do it. But by far the easiest method I've found to focus is with a Bahtinov mask, so named for Pavel Bahtinov who invented it in 2008.

The idea behind the mask is ingeniously simple. The mask creates a diffraction pattern that you look at either in your Live View mode (if you have it), or your computer software. You adjust the fine focus until the middle diffraction spike is exactly in the middle.

It's that simple. It takes 5 minutes, tops, once you get the focusing routine down. You aim at a bright star, focus, and then slew your mount to whatever it is you want to image. If you are doing a particularly

long imaging session and depending on your particular focuser, you might want to recheck your focus during the evening, but for me, once I'm focused, I'm usually good for the evening.

The Bahtinov mask is available from various retailers. You can also make your own with a piece of cardboard and an exacto knife, and there are multiple online sources for templates for various types of telescopes.



Here are some retailers:

Farpoint Astro:

<http://www.farpointastro.com/focus.php>

Spike A:

<http://www.spike-a.com/>

Astro-zap:

<http://www.astrozap.com/scripts/prodList.asp?idCategory=74>

Farpoint Astro has a youtube video here:

<http://www.youtube.com/watch?v=aMdkXrkygDk>

Mount Diablo Astronomical Society Event Calendar—June 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	Observatory Maintenance (Private) 1 Sunset: 8:27 PM
2	3	4	5	6	7	Society Observing (Private) 8 Sunset: 8:31 PM 
9	Board Meeting (Private) 10	11	8:45 PM Walnut Acres Elementary 12	13	14	8:00 PM Public Astronomy 15 Sunset: 8:34 PM
16	9:00 PM Scholar Ols Star Party 17	18	19	20	21	RHCC Stargazing (Private) 22 Sunset: 8:36 PM
23	24	7:15 PM GenMtg: NASA Data Online Solar camp (Private) 25	26	27	28	29 Sunset: 8:36 PM
30	1	2	3	4	5	6

Yosemite Star Party July 5th and 6th, 2013



Pictures of the April MDAS Public Night at:

<https://www.everpix.com/public.html?id=bhQGjya18eOLoyO8>

You may also view a video by John Read:

<http://www.youtube.com/watch?v=U1bpN7eJZwk&feature=youtu.be>

Board Members & Address

President

Chris Ford - cford81@comcast.net

Vice President

Rick Linden - Rick.C.Linden@gmail.com

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Marni Berendsen - berendsen@aol.com

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Dick Flasck - rflasck@aol.com

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Jim Head - jamesnhead@comcast.net

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Nick Tsakoyias - claytonjandl@aol.com

Mailing address:

MDAS

P.O. Box 4889

Walnut Creek, CA 94596-3754

General Meetings:

Fourth Tuesday every month,
except on the third Tuesday in
November and December.

Refreshments and conversations at 6:45 pm;

Meeting begins at 7:15

Where:

Lindsay Wildlife Museum

1931 1st Avenue

Walnut Creek, CA 94597

(925) 935-1978

wildlife-museum.org

Directions to facility:

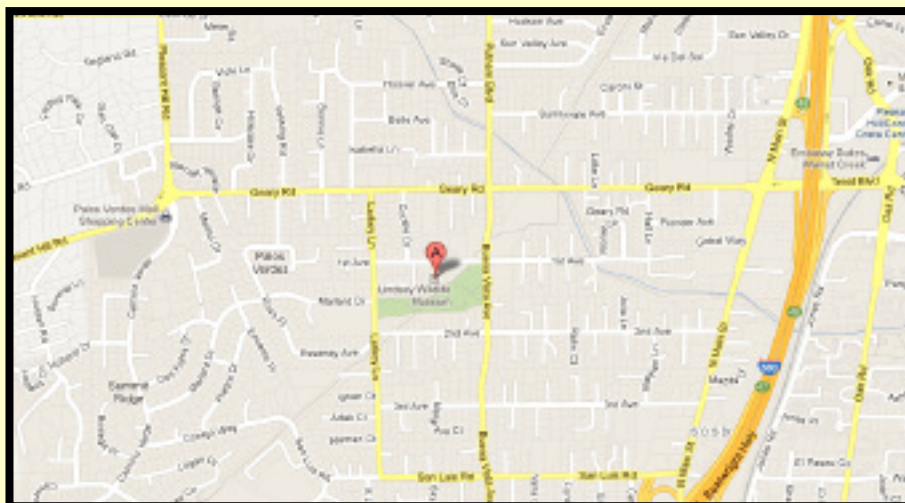
From the North: Take 680 South to Treat Blvd.
exit. Turn left at light onto North Main St. Turn
right on Geary Road. Turn left on Buena Vista.

Turn right on First Avenue. The museum is
halfway up the block on the left.

From the South: Take 680 North. Take the Treat
Blvd./Geary Road exit and turn left over free-
way. Go three more lights and turn left on
Buena Vista. Turn right on First Avenue. The
museum is halfway up the block on the left.

Parking:

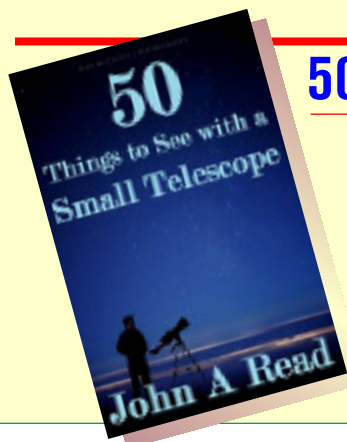
The museum is located in a residential area.
There are no parking fees nor meters. Please
park only in the museum parking lots on the
east side of the museum, the Friends Church lot
across the street (except Sunday mornings) or
on Buena Vista Avenue. Please do not park on
First Avenue in front of our neighbors' homes
— you will get a parking ticket.



As Always Writers Are Wanted

We are always looking for new articles and content. If you have astronomical perspectives or experiences to share with your fellow members that you would us to consider, please feel free to contact me Chris (cford81@comcast.net) or our newsletter editor Vianney (veloroute@hotmail.com). Clear skies!

— Chris and Vianney



50 Things to See With a Small Telescope

Written by our very esteemed MDAS member John Read, this book is a quick reference to some of the most obvious astronomical objects that can be observed with a small telescope.

This book is available in the Kindle version and in paperback as well at:
http://www.amazon.com/s/ref=nb_sb_ss_i_0_25?url=search-alias%3Daps&field-keywords=50+things+to+see+with+a+small+telescope&srefix=50+things+to+see+with+a+s%2Caps%2C4042